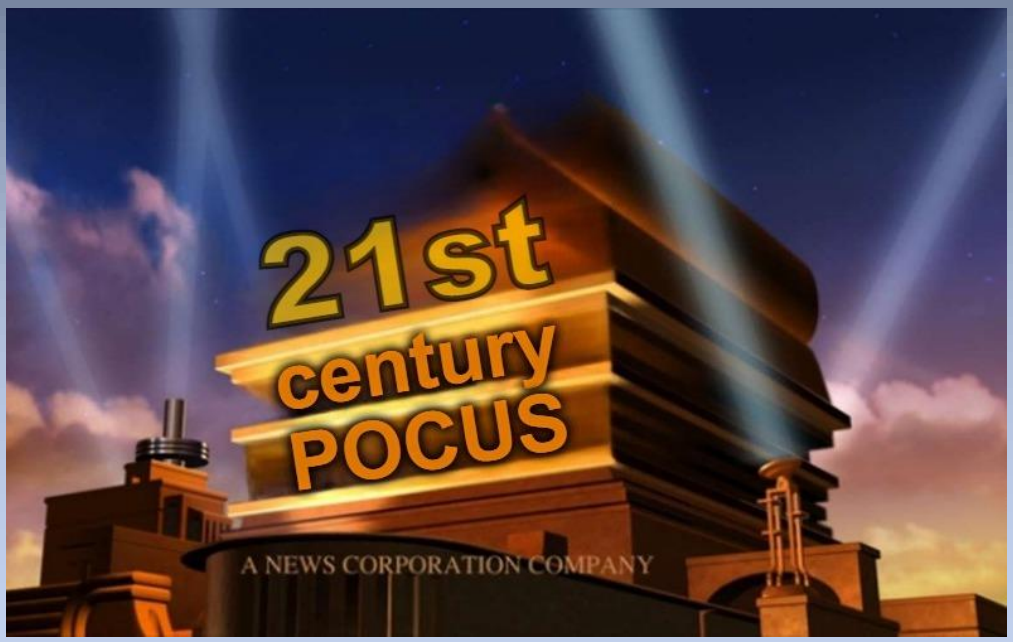
POCUS Journal

International POCUS Academy

JANUARY 2024

Non-profit organization of national Point-Of-Care-UltraSound schools



Dear friends and colleagues,

As we step into the New Year of 2024, we carry with us the same great hopes as always: for good health, love, and happiness for ourselves and our families, as well as desires for financial stability, professional success, and every other form of achievement. We look for peace, a precious commodity that continues to elude us amidst the numerous conflicts, wars, and suffering plaguing the globe.

As health professionals dedicated to the well-being of our patients, it is incumbent upon us to do everything within our power to enhance our knowledge, improve our performance, and provide the best possible care. This commitment extends to our POCUS skills, which are gradually becoming indispensable in our daily work and routines. From this perspective, even contributing to a small online medical journal, is a meaningful contribution to the overall progress and betterment of humanity. It serves as our way of combating chaos, ignorance, and all forms of suffering.

Wishing you a great New Year, and may you remain focused on POCUS!

Dr. Ivica Zdravković, Editor
Secretary General of the IPA

ULTRASOUND AS AN ADJUNCT METHOD IN THE ASSESSMENT OF NEUROLOGICAL STATUS

By Prim. dr. Željka Popović,
Director of IPA national school in Bosnia And Herzegovina

A 70-year-old patient arrives accompanied by two daughters who are concerned about his condition. Over the past 5 days, they have noticed that he has difficulty moving and occasionally struggles to articulate certain words. The symptoms emerged after significant physical exertion. They mention that despite the patient's age, he was quite vital and healthy. He had not visited a doctor before and had no chronic illnesses. However, due to the prolonged symptoms, they brought him to a medical examination.

During the examination, the patient is somewhat upset about being there but could not refuse the concerned daughters. The patient is cooperative, oriented in time and space, and shows no neurological deficits.

Considering the information provided by the daughters, which is not correlated with the neurological status, I suspect a Transient Ischemic Attack (TIA). I decide to perform an ultrasound of the neck blood vessels, and the findings are as follows:

During the examination of the right internal carotid artery, a critical stenosis with a fibrinous plaque of irregular edges was found.

I suspected a rupture of the distal part of the artery, prompting an urgent CT angiography, which confirmed the diagnosis. The patient underwent surgery and is feeling well.

CONCLUSION:

In Bosnia and Herzegovina, very few family doctors use Point-of-Care Ultrasound (POCUS). There are numerous reasons for this: the unavailability of equipment, lack of education, and a reluctance to invest more time and take on additional responsibilities, especially when not accompanied by higher financial compensation. The patient described was not under my care and happened to come to me by chance. He was fortunate because, given his normal neurological status, he might have been sent home and could have rapidly succumbed to death, as the plaque he had was already ruptured and unstable. However, there is a glimmer of hope as POCUS has been included in the mandatory training program for family doctors starting this year.

I hope that when I write an article for this journal in the year 2050, ultrasound will be as commonplace as the stethoscope is today.

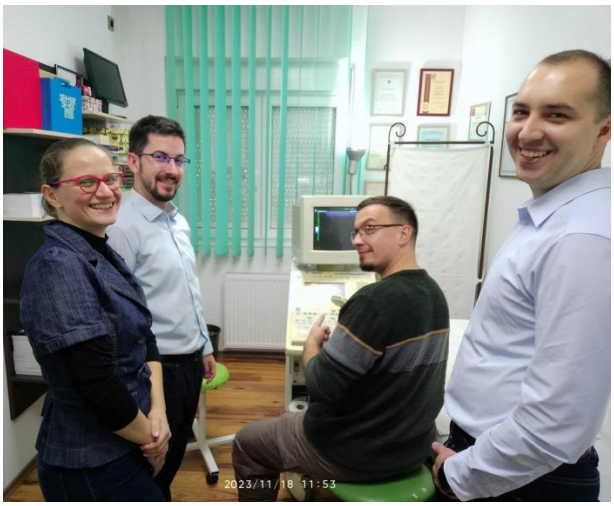
POCUS ACADEMY OF SERBIA
activities in past 6 months

Our Academy has been involved in numerous activities over the past 6 months. As always, we welcomed new students, with doctors completing their POCUS training at our main office:

For names of all new and old members/alumni of our Academy, please visit this link:

http://www.pocus.edu.rs/serbiamembers.htm

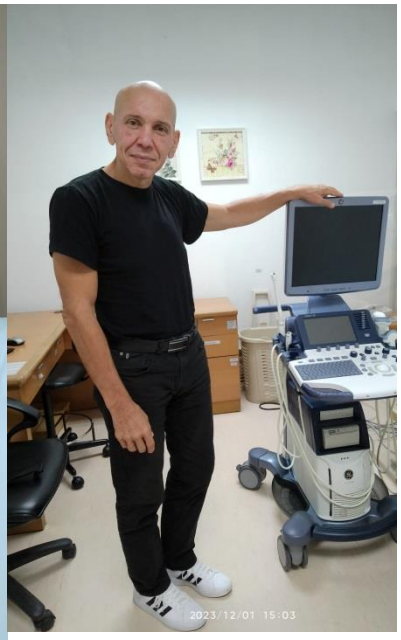
On November 18th, 2023, we had a meeting of the Council of the Pocus Academy of Serbia in Požarevac. In addition to the session, a demonstration of the PROBE protocol was conducted. The gathering was attended by 11 doctors from Požarevac, Kostolac, Žabare, Pančevo, Kovačica, Kučevo, and Kruševac. In a friendly atmosphere, we once again affirmed the commitment of our association to promote the concept of POCUS diagnostics as an essential part of propaedeutics in the daily work of doctors of all clinical specializations.



We also got a new training center! Our dear colleagues and instructors from the Pocus Academy of Serbia, Dr. Dejan Živanović and Dr. Vekoslav Zajić, opened a beautiful clinic in Svilajnac. Besides serving patients for successful diagnostics and treatment, their "Medikus PLUS" clinic is also a new educational base - training center for learning POCUS ultrasound diagnostics, so we warmly recommend it to all colleagues interested in training. GOOD LUCK!!!

IPA Journal Editor in Thailand

To visit a country and not explore its healthcare system is unthinkable for me. It's a professional inclination. So, as part of my visit to Thailand, I went to the beautiful Samitivej Srinakarin Hospital, thanks to my connections, my friend Srđan Ilić, who facilitated my contact with Ratchanee Yamket "Jeab" and with Daron Wejsawan, the ladies working at this hospital. I conducted an extensive interview with a colleague - a radiologist at this hospital, precisely on the topic of POCUS diagnostics, and I learned that POCUS is used in Thailand, but is still not taught during regular studies. It serves mostly in ERs... Of course, I didn't miss the opportunity to take the probe in my hands even here, tens of thousands of kilometers away from home.



[International POCUS Academy on FB]

Believe it or not, POCUS is practiced on a remote island in southern Thailand! Here I am at Phi Phi Islands Hospital; they took me to the ultrasound room. There you have it... POCUS everywhere!

Ultrasound everywhere...

POCUS WORKSHOP
Veliko Gradište, December 2023

On December 15th and 16th, 2023, a workshop was held at the Health Center Veliko Gradište, during which colleagues were educated in POCUS ultrasound diagnostics according to the PROBE protocol. On behalf of the Pocus Academy of Serbia, the workshop was conducted by Prim. Dr. Ivica Zdravkovic, the director of the Academy and its associate professor. Ten doctors participated in this intensive course, including general practitioners, general medicine specialists, radiologists, and physiatry specialists. Thanks to the hosts and organizers, Dr. Ljiljana Stevanović, the director of the Health Center Veliko Gradište, and Dr. Nedeljko Vasic, the head of the general medicine department. Also, thanks to all participants, especially to specialist colleagues who helped as assistant-instructors, Dr. Olivera Radulović, a radiologist, and Dr. Dejan Radivojević, a general medicine specialist.

POCUS AKADEMIJA SRBIJE

International POCUS Organization

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ROLE OF POCUS IN DETECTION OF THROMBOSIS
A CASE OF CATHTER RELATED THROMBOSIS

Emad Khater MD. FACP. FASN. MRCP (UK). FRCP (Glascow)
Consultant nephrology, Seha Kidney Care

INTRODUCTION

Patients with sever illnesses particularly in ICU sitting required central vain catheter CVC. The CVC may associated with multiple complications including infection,sepsis,stenosis and catheter related thrombosis CRT . Catheter related thrombosis most of the time is limited but it may associated with sever fatal complications.Point of care ultrasound (POCUS) is simple, non invasive bedside procedure can predict thrombosis with very high specificity and sensitivity.

METHOD

We reported a 32 years old female patient ESRD on Haemodialysis through right side tunnelled dialysis access admitted as a case of central line related septicaemia. The dialysis access removed as a source of infection. She developed pain swelling at internal jugular catheter.

An ultrasound on the internal jugular showed clot (thrombus) figure 1, patient treated with anti coagulation initially, low molecular weight heparin, then maintained on apixiban.

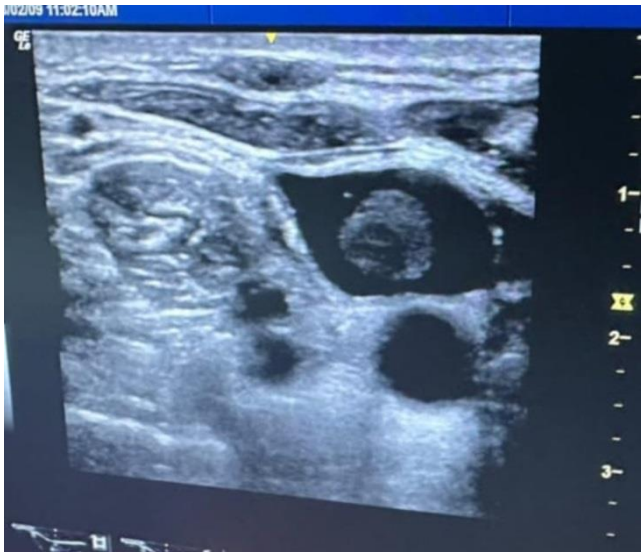


Figure 1, thrombus in internal jugular

Then removed catheter also showed clot at the tip. Figure 2 (see next page)

DISCUSSION

Central line related thrombosis CRT it relatively common complication. Although majority of cases are mild, without serious complication, some may cause serious fatal morbidity and mortality like sever pulmonary embolism..

The prevalence is high in fact, and majority (70 to 80 percent) of thrombotic events occurring in the superficial and deep veins of the upper extremity are due to intravenous catheters.

There are different risk factors which increase the risk for catheter-related thrombosis, including hypercoaguble status like cancer patient, malposition of catheter tip, use of larger diameter catheters with multiple lumens particularly in small lumen vessels (catheter-vessels ratio),

placement of left-sided catheter due to structural anatomy of the vessels, presence if concomitant infection and hormonal therapy.

In regards to CRT mechanism, there are several mechanisms playing a role in the development of CRT, including trauma and damage of endothelium caused by intravenous catheter, which induce the cascade of thrombus development.

Detection of CRT can be done easily with POCUS, with very high specificity and sensitivity.

Treatment of CRT is controversy with no clear guideline, and its taken case by case. In general, not always, line needs not to be removed unless its infected or obstructed, and overall anticoagulation needed for at least 3 months.

CONCLUSION

The use of CVC currently is increasing. Complication of CVC is common. CRT is one of major complications. POCUS is easily diagnostic tool to predict CRT. Early detection allow early intervention and avoid any serious complication.

Figure 2 A, thrombus on catheter tip

Figure 2b tip catheter thrombus

POCUS MOSCOW
Activities for the second 6 months of 2023

(Report from POCUS MOSCOW Group, IPA national Scool in Russia, contributed by prof. dr. Vsevolod Lykhin, Board member of IPA)

BUILDING INTERNATIONAL POCUS ACADEMY SCHOOL

Dear POCUS connoisseurs!

POCUS MOSCOW Group continues to develop educational events around the world. As part of the routine work at Botkin Hospital, practical training on basic POCUS programs actively continues, our team insists on the need for frequent courses, at least 2 times a week. Only streaming training can significantly increase physicians' awareness of POCUS capabilities for real-world work. This year we were able to make remarkable progress in the number of courses, we have held more than 150 educational events of varying lengths this year. The POCUS MOSCOW team has begun to scale its strength, both in terms of faculty (more than 10 instructors) and in terms of filling it with a variety of programs. We pay special attention to the development of regional training programs in different regions of Russia, as well as in other countries Kazakhstan, Kyrgyzstan, Uzbekistan, Belarus.


At the end of August 2023, we were invited to conduct a 3-day course in the Republic of Kyrgyzstan in Bishkek. This course was organized with the support of the Kyrgyz State Medical Academy named after I.K. Akhunbaev. The main direction of the course was regional anesthesia of expert level under ultrasound control. Colleagues showed great interest in this training, the three-day program included all the classical methods of brachial plexus blockades, peripheral nerves of the lower extremity, and we also learned the basic myofascial blockades. Such training allows to immerse attendees in the peculiarities of ultrasound anatomy, to obtain the necessary practical skills for successful visualization of the needle and safety of procedures.



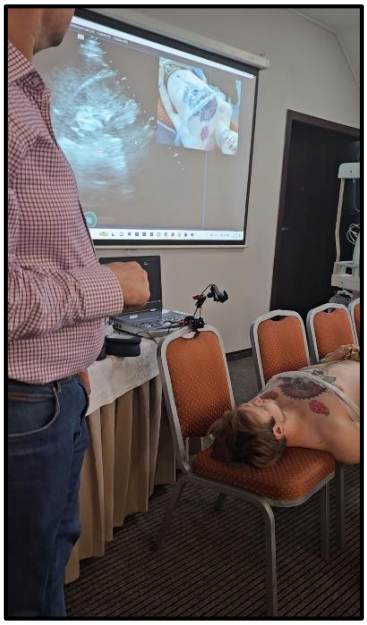

The next milestone event for POCUS MOSCOW was the educational week in October. Our team took part in the PHILIPS FOUNDATION educational project, this project includes charitable transfer of Lumify portable ultrasound systems into the hands of doctors of various specialties. The training took place in the city of Talgar, Republic of Kazakhstan.

During 3 intensive days doctors of anesthesiology, ICU, surgery, gynecology, ultrasound doctors received knowledge on the use of POCUS at the intersection of specialties. The program included multi-organ assessment of patients with various pathologies, vascular access and elements of regional anesthesia. Colleagues from remote regions of Kazakhstan truly appreciated the capabilities of portable ultrasound systems in real work.

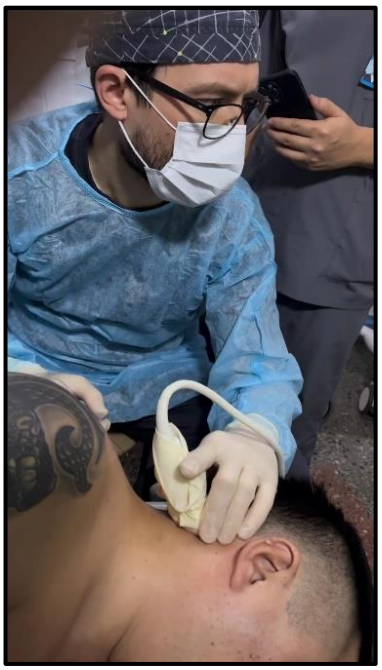
Then from Talgar we moved to Almaty to the congress of anesthesiologists and resuscitators of the Republic of Kazakhstan. As part of the congress, we held a series of master classes together with the Director of IPA School Kazakhstan Sergei Kim. We held our current program POCUS in blood purification in Kazakhstan for the first time.



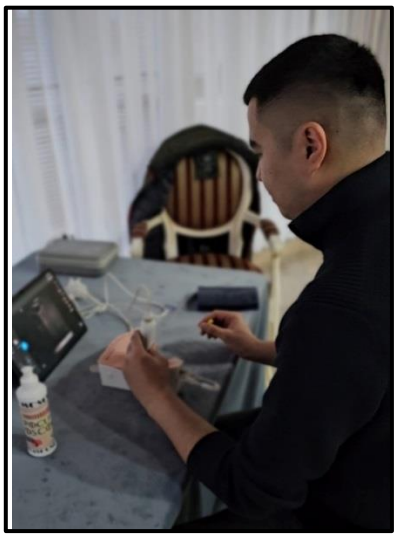
The next stop on our journey was St. Petersburg, where we held a large educational event on the integration of POCUS into the structure of blood purification procedures.

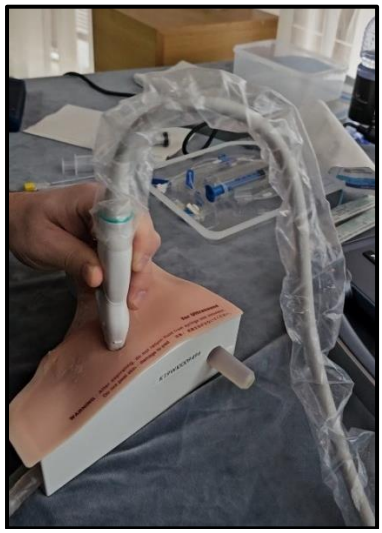



In late October, our colleagues from the city of Pavlodar in Kazakhstan requested an IPA workshop. From the very first day, a group of interested colleagues actively got involved. We emphasized practical training with a focus on ultrasound-guided treatment of acute and chronic pain. During 5 days of training, we managed to understand all the main POCUS topics for anesthesiologist. Lung ultrasound, urgent protocols (eFAST, RUSH, focal ECHO), we practiced important ultrasound-guided blockades for pain management in patients after surgical interventions, as well as for patients with chronic pain.

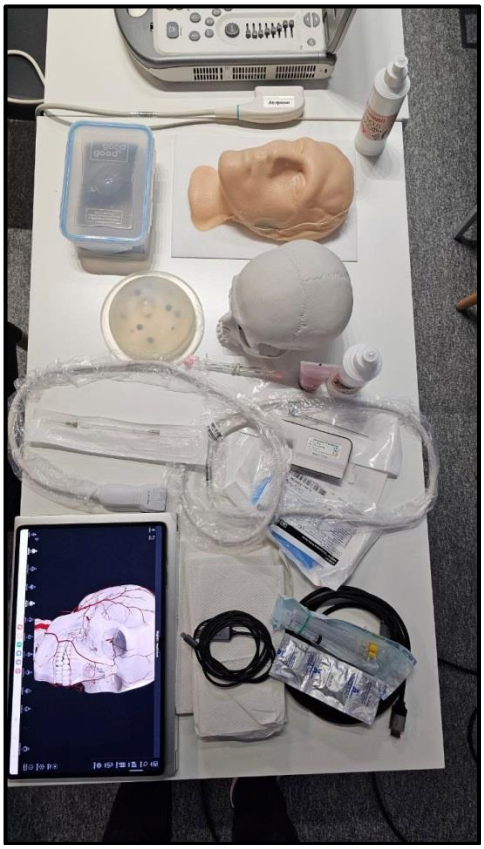


December saw the last POCUS IPA school of the year in the Republic of Kazakhstan. Colleagues from the wonderful city of Aktau, on the coast of the Caspian Sea, dedicated five days of their lives to gain new knowledge and skills in Point-of-Care Ultrasound. Structured and methodologically correct training in 5 days' time frame allows to significantly increase the focus of doctors' attention on POCUS capabilities for real work here and now. Our schools are traditionally held at a high level of technical preparation, we try to use all technologies for comfortable video broadcasting, capturing images directly from ultrasound machines, using highly realistic phantoms for practicing practical skills, as well as standardized models for real ultrasound scanning.





What new things did this year bring for POCUS MOSCOW? We continue active cooperation with veterinary anesthesiologists, where the development of ultrasound navigation for vascular access and regional anesthesia has progressed significantly over these 2 years. In addition, we held our first webinar and in-person course on POCUS Aesthetics. Facial soft tissue ultrasound is the new safety trend and future quality standard for cosmetic surgeons worldwide. Safe aesthetic medicine is the key to a successful business. The main direction is related to visualization of vascular structures, which avoids inadvertent injection of filler into an artery (risk of skin necrosis and blindness), layer-by-layer ultrasound anatomy of facial tissues and special attention to SMAS and fat pads.

The POCUS MOSCOW team is actively involved in the joint prototyping of phantoms for POCUS needs. Now we have created phantoms for practicing skills of invasive manipulations (vascular access, regional anesthesia), as well as a phantom for ultrasound examination of facial tissues with the possibility of injection technique.

IPA POCUS MOSCOW has attracted some new like-minded people:
Elena Adieva, Aleksandr Branovets, Andrey Sakerin, Safura Dosaeva, Denis Klynkin, Pavel Degtyarev, Ekaterina Shichanina, Diana Nasibova, Pavel Kiryukhin, Julia Trenenkova.

Clinical case:
Closed screw-shaped fracture of the middle third of the left humerus with displacement

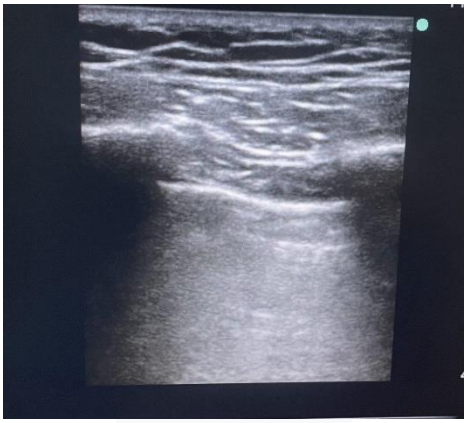
Mustafin R.A., Kim S.I., Professor K.Z. Makazhanov Hospital., Kazakhstan, Karagandy

Description of a clinical case:

A 67-year-old patient was admitted to our clinic with a diagnosis of a closed screw-shaped fracture of the middle third of the left humerus with displacement. Healed fracture of the surgical neck of the left humerus. Status after MOS (as of 2018). Healed fracture of the lower third of the left humerus. Status after MOS (dated April 9, 2019). Upon further examination, the patient was diagnosed with: Arterial hypertension of the 3rd degree, risk 4. Varicose veins of the vessels of the extremities. Chronic pyelonephritis, latent course, act 1, chronic renal failure 0. Hypothyroidism. Convulsive syndrome generalized by epileptic seizures. Anemia of mixed origin, grade 1. For the purpose of stable fixation of fragments and prevention of secondary displacement, an open reduction operation is planned. MOS bone plate with angular stability of the left humerus.

Anesthesia plan:
During a consultation with an anesthesiologist, the patient categorically refused general anesthesia. Considering the patient's preferences, the scope of the planned operation, and medical history data, the anesthesia method was chosen to block the brachial plexus using the supraclavicular method using ultrasound navigation.

Description of the technique:
For periprocedural assessment of pneumothorax, the patient underwent an ultrasound of the lungs, before and after surgery. To perform lung ultrasound, the transducer was positioned in the second intercostal space along the midclavicular line on the left and right sides. Pleural sliding was verified bilaterally. Pleural sliding is a sign of absence of pneumothorax.



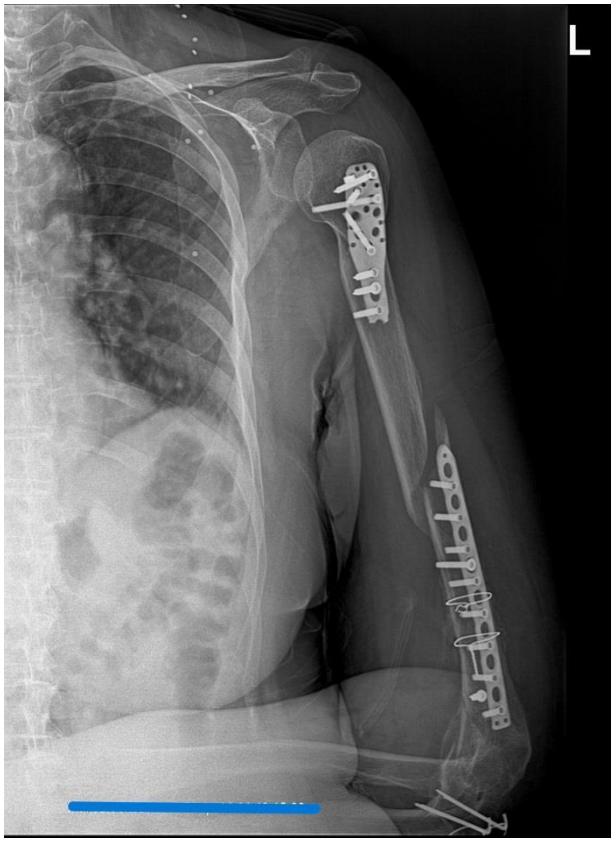
Lung Ultrasound

The patient was injected with Sol on the operating table in the supine position, after cleaning the puncture site three times with antiseptic solutions. Skin local infiltration with Lidocaini 2% - 40mg subcutaneously. Under ultrasound control using a spinal needle - 22G, brachial plexus regional anesthesia was performed using a supraclavicular approach with injection of local anesthetic perineurally: Ropivacaine solution 1% - 100 mg + Sodium chloride solution 0.9% - 10 ml. No. 2. + solution Dexamethasone 4 mg. After removing the needle, an aseptic dressing is applied to the puncture site. On auscultation, breathing is carried out throughout all pulmonary fields, there are no wheezes. SpO2 - 99 - 100%. BP 120/80 m.r.s. PS - 86 beats. per minute the effect of anesthesia is satisfactory. This type of benefit was chosen to provide high-quality intraoperative and postoperative pain relief.

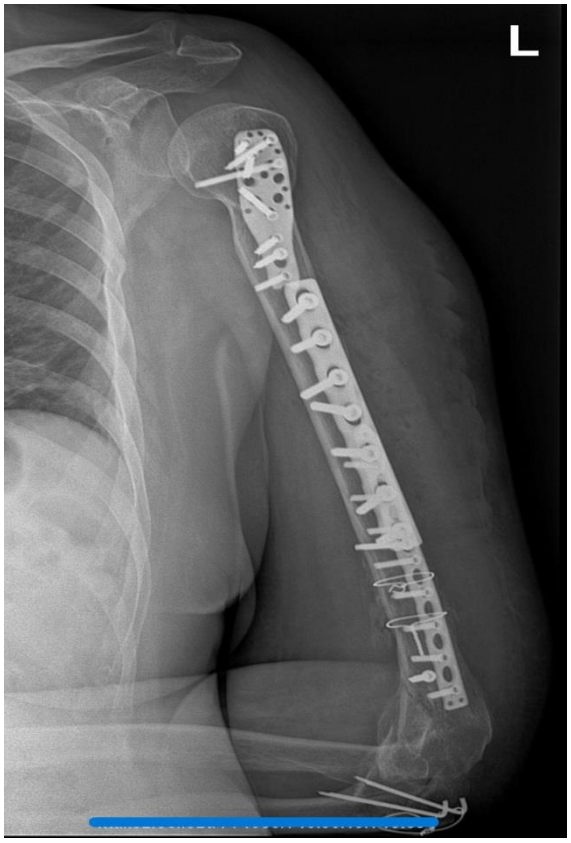
Supraclavicular Brachial plexus block

Results

A correctly performed brachial plexus block provided adequate anesthesia during surgery and sufficient relaxation of the muscles of the upper limb, which was noted by the operating traumatologists. The patient reported no discomfort and remained hemodynamically stable throughout the surgical procedure, thereby maximizing intraoperative blood loss. In the postoperative period, additional anesthesia was not required for 1.5 days. This case allows us to evaluate the effectiveness of regional anesthesia using ultrasound navigation when general anesthesia is contraindicated or not preferred.



before surgery



after surgery

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There Is No Ideal Ultrasound Mach...?

Ivica Zdravkovic, MD/PhD
Serbia, 2024

It's been five years since I became an instructor in ultrasound diagnostics, and for twenty years, I've been acquainted with ultrasound machines and probes. During these two decades, I've had the opportunity to use dozens of different machines, ranging from vintage ones without Doppler and with tiny monitors and a limited number of buttons to some of the latest "monsters" overloaded with all sorts of software features. I would like to write a few words about the overload of TOO MANY options in newer ultrasound machines, leading to impractical solutions on some devices.

I often say that the controls on the ultrasound machine console are like the buttons on your TV remote: there are dozens of them, but you only use a few, and it's better not to touch the rest, as you might break something! Indeed, this "science of buttons," knobology, is something that should only be briefly mentioned during ultrasound training, because each machine has its own story. Here, the so-called "trackball" is as large as a hand, while there it's small, like a marble. Here, the measurement button is clear, separate, accessible, and large, while there it's hidden as if we'll never measure anything.

Moreover, I must note an unusual trend: it seems like someone is trying to make newer devices more complicated and less user-friendly. It's like computer software: in the late 1990s, we worked wonders with early versions of Microsoft Office, CorelDraw, and Photoshop. I can't even launch the latest versions of these programs, which are supposed to be "user-friendly"! Everything appears to be more user-oriented to make things easier, but, in reality, everything becomes more complicated! This trend then affects ergonomics, making working conditions more challenging.

I will just mention some of the non-ergonomic "solutions" I've seen on these newer ultrasound machines.

1. Monitor Size, Data Display, B-mode and M-mode

Even though monitors have become large and flat, there hasn't been a significant improvement in image quality. Gray tones have turned milky, resembling scans, and there's less image granularity, creating the illusion of sharper and more precise visuals. However, this is only superficial. The lower measurement range is still around 1mm, and the resolution remains practically the same. Additionally, the active area of the monitor often only partially belongs to the display of organs. Everything else is numbers, numbers, numbers – millions of data points that I've reliably determined NO ONE, including us doctors (including radiologists!), truly understands.

On my old machines, which I still use today, when switching to M-mode, the previous B-mode remains on the right, and the screen is split vertically. On most new machines, when you activate M-mode or want to perform PulseWave measurements, the previous "B-mode" simply shrinks and moves upward, almost becoming invisible, while M-mode appears below. Now, try to figure out how to navigate this. Who, when, and why thought this was more practical - probably someone with a questionable sense of humor.

2. Presets, Dopplers, Frequencies

Changing the probe on older machines usually meant changing the "preset" – a set of image adjustments, acoustic power, frequency, Doppler settings, etc. Now, for each probe, we have five or ten "presets." Often, for example, the Doppler on the preset for the thyroid is better than the Doppler on the preset for carotids! Perhaps it wouldn't be a bad idea to agree on a basic, foundational setting instead of numerous presets, and have it initiated by selecting the probe.

Maybe I sound lazy, but in life, the rule "small is good" is often quite applicable. Fewer options, fewer complications.

The same applies to frequencies. Probes are mostly multi-frequent, allowing frequency changes from, let's say, 3.5MHz and up. However, it's often a challenge to find where this is done. It's as if someone intentionally tries to hide this option. The same goes for changing the incident angle of the Doppler wave, shifting the baseline of PW measurements, etc.

3. Measurements

Let's be clear; measurements, alongside recognizing echo structures and observing vascular activity, are the most crucial activities in ultrasound diagnostics. Therefore, I want the measurement start button and everything related to measurements to be PROMINENT and in an optimal place. Not hidden among other buttons, requiring five previous clicks.

Measurements can vary, but the basics are distance in B-mode, volume measurement, and surface area. The software interface should facilitate easy switching between these measurements, and preferably allow simultaneous tracking of changes. For example, measuring prostate volume simultaneously with the diameter of a calculus at the base of the bladder. You probably don't think about these things when buying a new machine. Those who sell the machines, mostly technical personnel, won't talk much about them either, as they won't spend hours, days, and years grappling with impractical solutions.

The same goes for Doppler and PW/CW measurements. They must be INTUITIVELY accessible. I don't know how many times I've puzzledly stared at the monitor trying to figure out why I found a blood vessel, verified the flow through it with Doppler, and when I wanted to turn on PW and clicked the PW button, nothing happened! And why? Because someone thought it was a good idea to insert an "Update" button!?? Why – I don't know, and I don't want to know. I know that it's not there on my old Japanese machine. If I click PW, PW appears. No "update" is needed.

A lot could be written about measurements, but as I engage in POCUS diagnostics, I'll leave it at this: basic measurements should be offered first, not sought like a needle in a haystack of options. For example, during PLAX measurements, I'll measure the aortic root (Ao), separation of aortic cusps (MACS), width of the left atrium (LA), and RVOT. Then, I'll measure EPSS, followed by EDD, ESD, as well as the thickness of the septum (IVSd) and posterior wall (LVPWd) during diastole. And I want FS and EF to appear after these measurements. Or give me a calculator button, and I'll calculate EF myself.

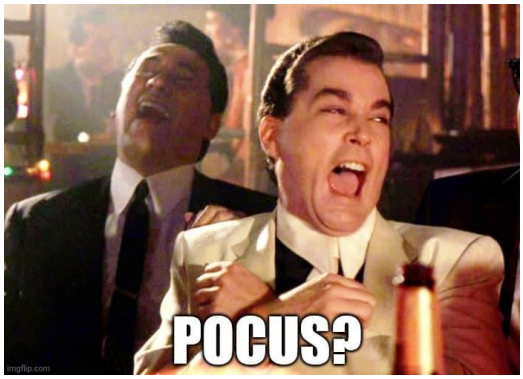
4. Gain, Illumination, Focus, Depth

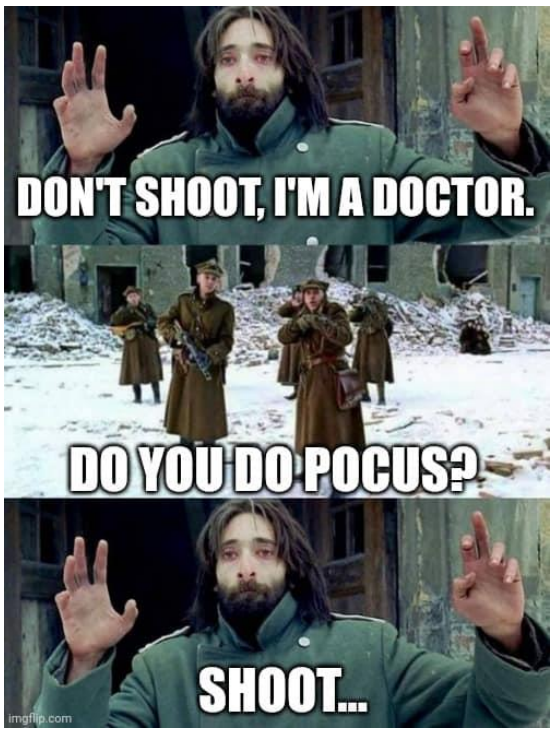
It's clear that all the mentioned functions are necessary for optimizing the image. As they are closely interdependent, they should either be grouped or intuitively and strategically well-placed. Unfortunately, this is often not the case. On most machines, buttons have two functions - which change with a button press or an additional touchscreen click. Again, unrelated functions are often grouped on the same button. For example, the "gain" button, when clicked, has an alternative function for changing focus. This is completely unacceptable. Gain is gain, and focus should be changed elsewhere, or on the same button as depth...

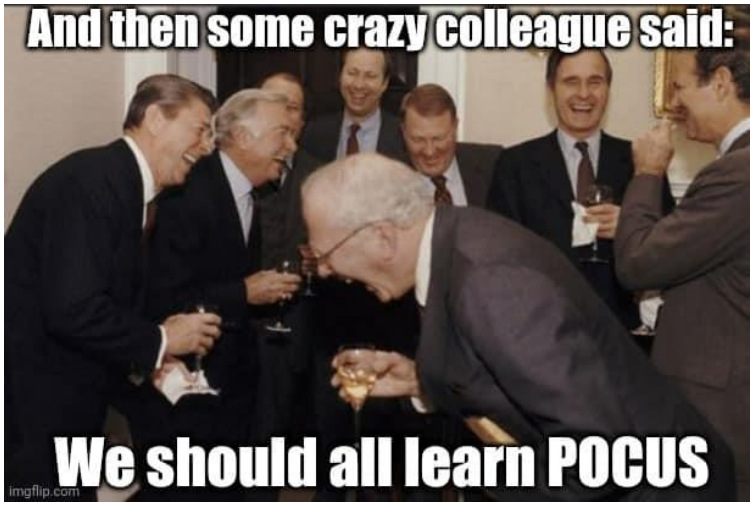
Moreover, why not finally have image functions on machines like on photo editing programs: brightness, contrast, zoom, sharpen, blur...? It would be much simpler. I don't want to deal with the physics of ultrasound while observing a pancreas or heart. I want to focus on imaging. That's why it's easier to use commands like "brighten," "sharpen," "zoom," etc., rather than "change frequency" and "increase acoustic impedance." Tomorrow we'll use AI. I wouldn't like to use overly technical terms in my future prompts, if we can understand each other more simply.

And so on and so forth... It's clear that it would probably be best and most useful for me, instead of writing this article, to simply sit down and design my own ideal POCUS machine, which, with a minimum of two probes and optimal commands and software solutions, would meet the ergonomic and clinical needs of most general/family medicine doctors, ER doctors, etc. Maybe that's not such a bad idea. After all, engineers have dictated working conditions to us doctors for quite a while; let's take the opportunity to tell them what kind of machine we need.

POCUS MEMES







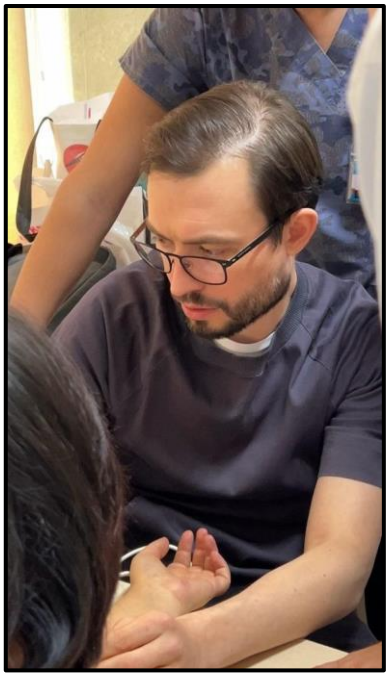
The Crucial Role of Ultrasound in the Intensive Care Unit

Dr. Roditelev Alexandr, Pavlodar, Kazakhstan
Dr. Proshunin Andrei, Pavlodar, Kazakhstan
Dr. Gukov Alexandr, Pavlodar, Kazakhstan

Introduction:

Knowledge and use of ultrasound in intensive therapy has now become a mandatory skill of every resuscitator. This technique is convenient for its accessibility, speed and the possibility to use it in almost any conditions, it is the intensive therapy unit and the operating room and the department of resuscitation, etc.

Until recently, the use of ultrasound was limited to navigation during the installation of central veins and the Fast Protocol for admission of severe patients to the Intensive Care Ward. However, the end of 2023 in our clinic was marked by a master class on the use of ultrasound in the department of resuscitation from POCUS-MOSCOW.



As a result, valuable knowledge was obtained on focal echocardiography, methods of regional anesthesia and catheterization of central veins by the "guide in the needle" method. We have also successfully performed Erector spinae plane block, which have found their application in the treatment of acute pain syndrome with rib fracture. The introduction of Peng-block into practice as a component of the strategy of early recovery after total hip replacement proved to be very valuable. The above-described blockade techniques showed the result of reducing pain from 8-9 points on a digital scale and a visual-analog pain scale to 1-2 points after 30 minutes.

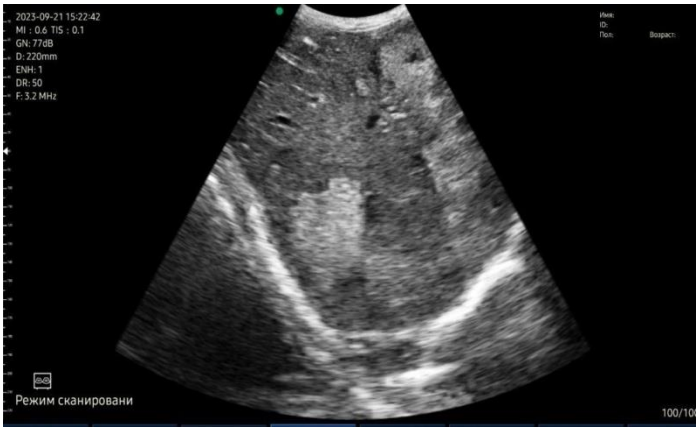
Conducting catheterization of central veins using the "guide in the needle" technique has also shown its advantages, such as the possibility of continuous ultrasound navigation during catheterization, reducing the time of the procedure, and increasing patient safety.

Special attention is paid to the treatment of chronic pain and the need for the active development of blockades under ultrasound navigation.

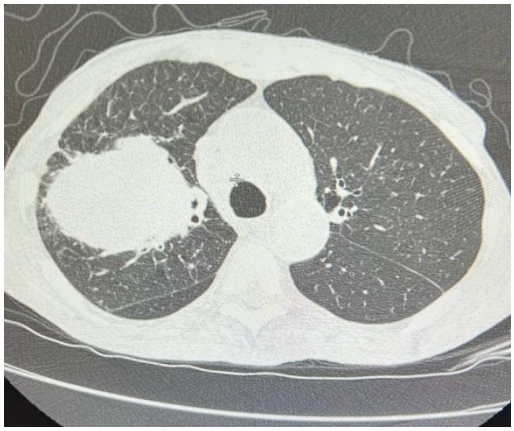
Below is a case of using ultrasound, which clearly demonstrates the possibilities of rapid diagnosis of patients at the stage of the Intensive Care Unit.

Case 1. A 45-year-old man requires emergent hospital with symptoms of hemodynamic instability. The patient has not been ill before and has not been examined. Notes a decrease in body weight for 15 kg for several months.Vital signs include blood pressure 80/40 mmHg, heart rate 100 beats/min, and respiratory rate 22 breaths/min. A fast-protocol was carried out in the emergency room. Ultrasound examination of the hepatorenal recess revealed multiple metastases in the liver. Hydrothorax was found in the pleural cavities. At other points the fast protocol was negative.

Upon further examination, the main diagnosis was established: lung cancer with metastases to the liver.



1. Liver metastases

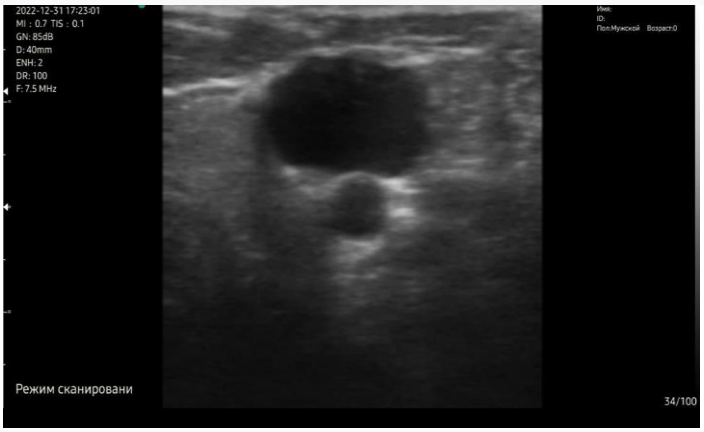


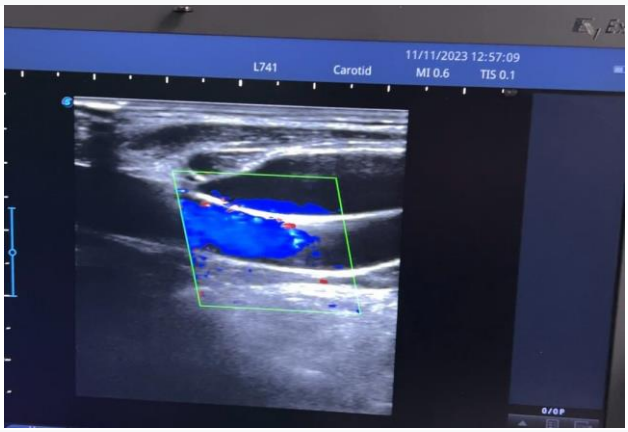
2. Primary focus. Lung cancer

Case2. A 53-year-old patient was admitted to the clinic with multiple stab wounds of the abdominal cavity. The indicators at admission were within the arterial pressure of 70/35 millimeters of mercury, heart rate- 115 per minute, frequency of respiratory movements -* 18 per minute, which corresponded to hemorrhagic shock of the 3rd degree and the volume of blood loss of more than 2.5 liters.

The patient was immediately taken to the operating room for an emergency operation. In order to provide infusion-transfusion assistance, the second anesthesiologist attempted to install a central venous catheter according to anatomical landmarks. The first attempt was unsuccessful, after which a portable ultrasound examination sensor was used. Sonography revealed that the subclavian vein collapses by 80-90% of the initial one on the background of hypovolemia.

When catheterizing the subclavian vein, the "guide in the needle" technique was used. Catheterization was carried out on the second attempt, thanks to continuous ultrasound navigation.





Conclusion

Routine use of the ultrasound in an urgent emergency room allows for rapid differential diagnosis, making quick decisions that improve the outcome of the disease and survival.

POCUS IN BOSNIA AND HERZEGOVINA

By Prim. dr. Željka Popović
IPA Board member

In Doboj, Bosnia and Herzegovina, we hosted the third International Medical Doctors Symposium this September. The symposium featured a hands-on workshop covering ultrasound of the thyroid gland and neck blood vessels, as well as a session on abdominal ultrasound. On the opening day, we showcased the "PROBE Protocol" book, a textbook distributed to all participants.

There was a tremendous interest in the workshop, and the spots were filled within just 7 days. To accommodate all eager doctors, we doubled the number of educators and participants. What's noteworthy about this workshop, compared to previous ones, is that two professors from the Department of Family Medicine at the Medical Faculty in Banja Luka joined the session, having heard about it from satisfied participants in previous years.

A game-changer in the specialization of family doctors in Bosnia and Herzegovina is the inclusion of Point-of-Care Ultrasound (POCUS) in the curriculum. This means that moving forward, every family medicine specialist will need to grasp the fundamentals of abdominal ultrasound.

One of our goals this year was to ensure participant satisfaction. To gauge this, each attendee filled out an anonymous survey on the workshop's quality and provided recommendations for the next year. Much to our delight, all participants showered us with praise, and many have already expressed their desire to return as our guests next year. In conclusion, it looks like brighter days are ahead for POCUS in Bosnia and Herzegovina. In the near future, we anticipate having family medicine specialists in this part of Europe proficient in independently conducting ultrasound diagnostics.

Official website of the event:

3. SIMPOZIJUM
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Evaluation of the left ventricular remodeling by means of stress-echocardiography after myocardial infarction.

E. Kreneva, N. Nelassov, R. Sidorov, M. Morgunov, M. Ovrulova, A. Nechaeva.
Rostov State Medical University, Rostov-on-Don, Russian Federation.

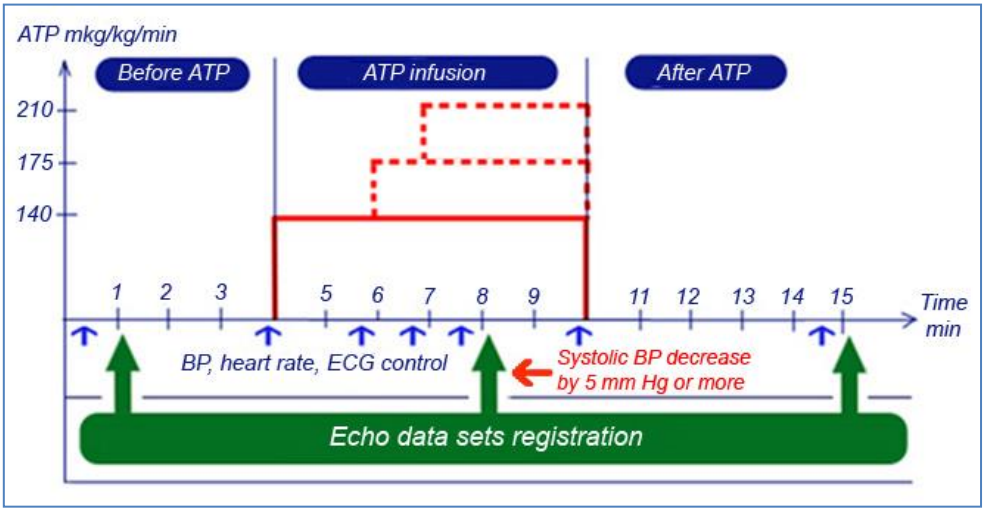
Introduction

Last year PubMed returned nine articles under the search term «Strain, remodeling, left ventricular (LV), myocardial infarction (MI)». The increase of research in this area is associated with the development of the advanced echocardiographic equipment. LV remodeling is an outcome of MI. This type of LV remodeling is linked to the loss of contractility of the myocardium (1,3). Initial echocardiographic research recognized left ventricular ejection fraction (LVEF), end-systolic volume (ESV), and wall motion score index (WMSI) as LV remodeling predictors (2). Nowadays, speckle-tracking echocardiography (STE) along with Cardiac magnetic resonance imaging (MRI) are applied for the further research of the functional LV remodeling (3).

We hypothesized that post infarction remodeling of left ventricular is not only the changing of shape and volume, but also the reducing of function by loss of regional contractility. The precision technique for that is tracking of wall motion during the cardiac cycle. Speckle tracking allows to assess and to compare the different types of deformation, but only four dimensional automated functional imaging method provides the evaluation of rotation and twisting during one cardiac cycle. This unique technology now is on the state of data collection and confirmation. Our aim was to find out whether the assessment of cardiac twisting and rotational function during stress-echocardiography (SE) can predict cardiac remodeling progression.

Materials and Methods

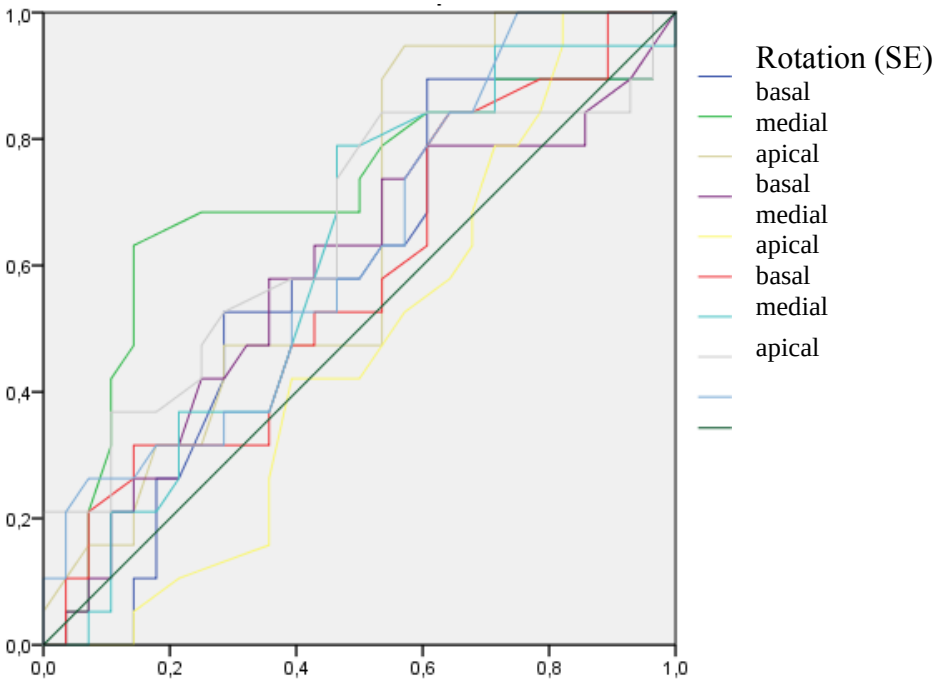
During the experiment, 47 adults underwent stress-echocardiography with ATP on US Scanner E Vivid 95 by 4D transducer.



F.1 Protocol of stress-echocardiography with ATP.
A patent for the invention № 2688441 (21.05.2019).

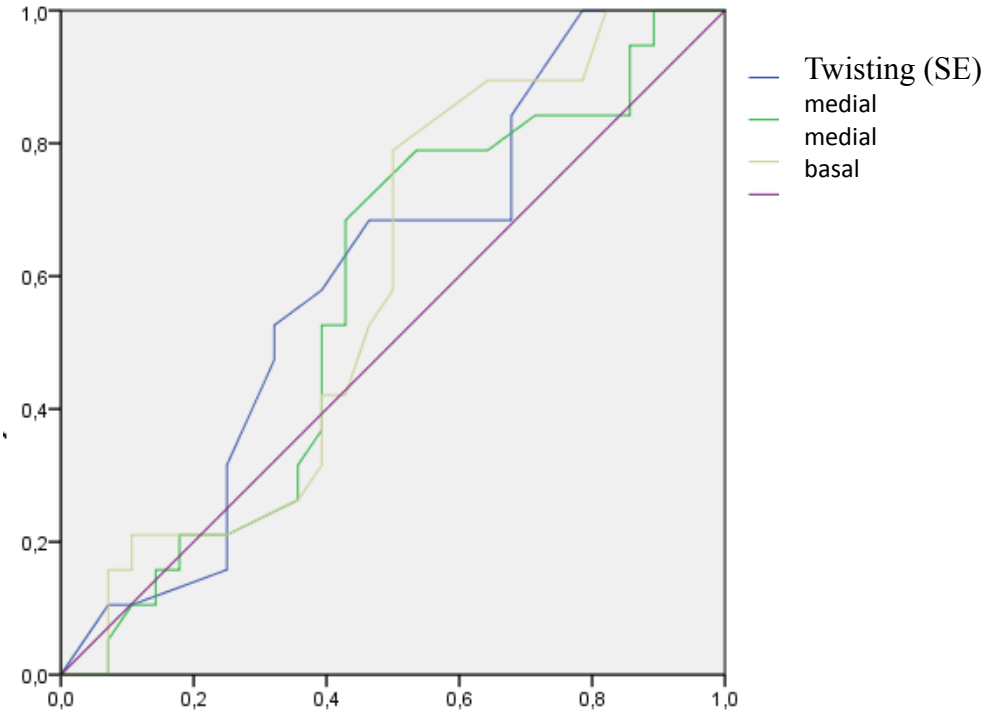
According to our protocol Adenosine Triphosphate (ATP) infusion stepwise increases from 140 mcg/kg/min to 210 mcg/kg/min. The dilation of intact coronary arteries was used for studying the transitional hypokinetic segments of the left ventricular. All patients were divided to 3 groups. The first group was presented by healthy adults and compared with 33 patients with ischemic heart disease, 17 of them had had myocardial infarction before. Regional and global strain values, especially rotation and twisting, were compared during the SE. Parameters of strain were compared by ROC analyses, a dependent variable was the increase of end systolic volume (ESV) on the peak of the stress.

Results



F.2 ROC analyses of rotation.

During SE, rotation of basal and medial segments varies: Area under the curve.
AUC =0,607…0,694 (95%, CI 0,407-0,808…95%, CI 0,461-0,928).



F.3 ROC analyses of twisting.

Similarly twisting of basal and medial segments — were moderately correlated with an increase in LV ESV and depends on presence or absence of MI:
AUC =0,596…0,654 (95%, CI 0,381-0,812…95%, CI 0,481-0,826).

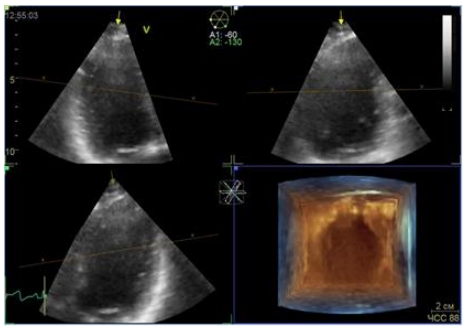
Twisting of basal and medial segments was related with an increase in LV ESV and depends on presence or absence of myocardial infarction: Area under the curve was on the moderate level with 95% confidential interval. Similarly, rotation of basal and medial segments varied. Indicators of remodeling after myocardial infarction, such as apical rotation strain and basal twisting strain according to the comparison of variances by Fisher criterion were revealed in a level of significance 0,05 - apical rotation strain ($F_{f=41}$ 3,165, p=0,95) and basal twisting strain ($F_{f=41}$ 3,380, p=0,95).

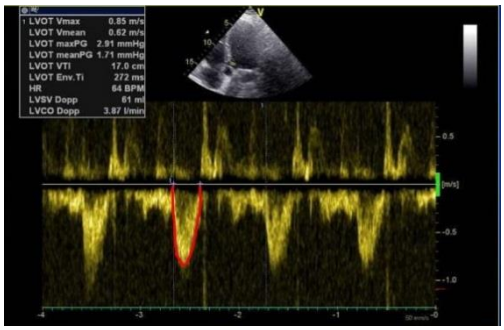
Conclusion

Assessment of twisting and rotation of LV after myocardial infarction during the stress echo with Adenosine Triphosphate allows us to predict the functional remodeling, according to our data.

Literature

1. Giovanni Andrea Luisi, Gabriele Pestelli, Giulia Lorenzoni, Filippo Trevisan, Vittorio Smarrazzo, Andrea Fiorencis, Filippo Flamigni, Roberto Ferrari and Donato Mele. Severe Impairment of Left Ventricular Regional Strain in STEMI Patients Is Associated with Post-Infarct Remodeling. // J. Clin. Med. //2022, 11(18), 5348; https://doi.org/10.3390/jcm11185348.
2. Gaudron P, Eilles C, Kugler I, et al. Progressive left ventricular dysfunction and remodeling after myocardial infarction. Potential mechanisms and early predictors. // Circulation. // 1993;87: P.755-763
3. Afsoon Fazlinejad (MD), Ali Samadzade (MD), Ramin Khameneh Bagheri (MD), Nayere Tousi (MD), Amin Rezaeian (MD). Does global longitudinal speckle-tracking strain predict left ventricular remodeling in patients with myocardial infarction? a systematic review. // Rev Clin Med //2016; Vol 3 (No 3) Published by: Mashhad University of Medical Sciences (http://rcm.mums.ac.ir)





Diagnostic accuracy of point-of-care ultrasound for shock: a systematic review and meta-analysis

Takuo Yoshida, Takuya Yoshida, Hisashi Noma, Takeshi Nomura, Akihiro Suzuki & Takahiro Mihara

Published: 25 May 2023

Abstract

Background

Circulatory failure is classified into four types of shock (obstructive, cardiogenic, distributive, and hypovolemic) that must be distinguished as each requires a different treatment. Point-of-care ultrasound (POCUS) is widely used in clinical practice for acute conditions, and several diagnostic protocols using POCUS for shock have been developed. This study aimed to evaluate the diagnostic accuracy of POCUS in identifying the etiology of shock.

Methods

We conducted a systematic literature search of MEDLINE, Cochrane Central Register of Controlled Trials, Embase, Web of Science, Clinicaltrial.gov, European Union Clinical Trials Register, WHO International Clinical Trials Registry Platform, and University Hospital Medical Information Network Clinical Trials Registry (UMIN-CTR) until June 15, 2022. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and assessed study quality using the Quality Assessment of Diagnostic Accuracy Studies 2 tool. Meta-analysis was conducted to pool the diagnostic accuracy of POCUS for each type of shock. The study protocol was prospectively registered in UMIN-CTR (UMIN 000048025).

Results

Of the 1553 studies identified, 36 studies were full-text reviewed, and 12 studies with 1132 patients were included in the meta-analysis. Pooled sensitivity and specificity were 0.82 [95% confidence interval (CI) 0.68–0.91] and 0.98 [95% CI 0.92–0.99] for obstructive shock, 0.78 [95% CI 0.56–0.91] and 0.96 [95% CI 0.92–0.98] for cardiogenic shock, 0.90 [95% CI 0.84–0.94] and 0.92 [95% CI 0.88–0.95] for hypovolemic shock, and 0.79 [95% CI 0.71–0.85] and 0.96 [95% CI 0.91–0.98] for distributive shock, respectively. The area under the receiver operating characteristic curve for each type of shock was approximately 0.95. The positive likelihood ratios for each type of shock were all greater than 10, especially 40 [95% CI 11–105] for obstructive shock. The negative likelihood ratio for each type of shock was approximately 0.2.

Conclusions

The identification of the etiology for each type of shock using POCUS was characterized by high sensitivity and positive likelihood ratios, especially for obstructive shock.

For full paper visit this **LINK**

The advantages of ESP-block as a part of anesthesia in comorbid patients with colorectal cancer.

E. Kreneva, A. Malyshev, V. Kulushev, V. Lykhin, M. Kreneva.
Botkin's Hospital, Moscow. Russian Federation.

Introduction

Colorectal cancer is a wide spread disease. 45277 new cases of colorectal cancer were registered in Russia in 2019. This kind of cancer occupies a leading position in morbidity and mortality among oncological diseases. (1). Therefore, the surgical interventions are constantly evolving. In colorectal surgery, laparotomy has recently been replaced by laparoscopic surgery, which provides reduced postoperative pain and stress response. Promptly, neuraxial anesthesia changes into modern interfascial plane blocks.

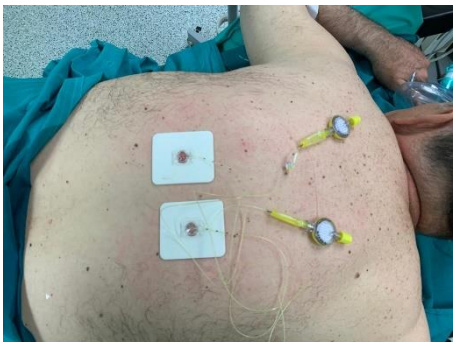
The erector spinae plane (ESP) block is a simpler and safer procedure compared to epidural block, because it has an easily recognizable sonoanatomy and no structures nearby pose a risk of needle injury. In addition, the ESP block does not have the risks of developing hypotension associated with epidural analgesia and vascular puncture associated with paravertebral blocks. (2).

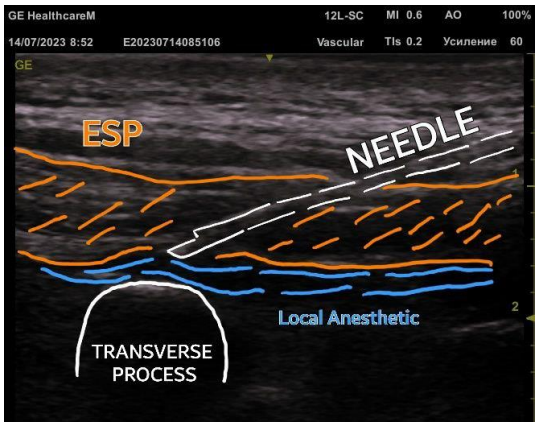
We hypothesized that an ultrasound (US)-guided ESP block might decrease postoperative pain score and analgesic requirements and would not cause hypotension. Therefore, we investigated whether bilateral ESP blockade reduced postoperative pain score and hypotension in patients undergoing laparoscopic colorectal surgery.

Materials and Methods

We recruited 64 patients aged 45-80 years (69±9,75), who were scheduled to undergo elective laparoscopic colorectal surgery due to malignant disease. The most of our patients had comorbid status, consequently, American Society of Anesthesiologists physical status was ≥ 3, Score of Perioperative Risk of Morbidity by Botkin's scale was 15-25 points. We randomly divided patients into 2 groups. The combined anesthesia with ESP block was carried out for patients of 1 group while patients of 2 group got the combined anesthesia with epidural analgesia. After premedication with midazolami (0.05–0,1 mg/kg) we performed bilateral ESP block on the level of T8. In craniocaudal direction 30 ml of 0.5% ropivacaine was injected on each side. While we took epidural analgesia on the level of T8, 15 ml of 0.5% ropivacaine was administered.

Anesthesia induction was performed with fentanyli (0.5–1.0 μg/kg), propofoli (1.5–2.0 mg/kg), and rocuroniui (0.6–0.8 mg/kg), and was maintained with sevoflurane (2–2.5 vol%) and fentanyli (0.5–0.1 μg/kg). In operating room were monitored non-invasive blood pressure, electrocardiogram, pulse oximetry, end-tidal carbon dioxide, minimal alveolar concentration of anesthetic, moreover, the Velocity Time Integral (VTI) by ultrasound transducer Lumify. Echocardiography was used for valuation of cardiac output before the anesthesia, after induction, in the middle of anesthesia and after extubation.





Results

Parameter	Group 1 (ESPB), Mean±σ	Group 2 (EA), Mean±σ	T criterion (95% CI on difference)
Age	66±10,3	70±9,5	1,092; -3,179 - 11,179
Male	70 %	56 %	
VTI LVOT	22,1±4,4	22,3±6,35	0,091; -4,128 - 4,528
VTI Ao	17,1±4,5	18,3±5,36	0,621; -2,586 – 4,986
SBP	127±11	129±12,5	0,439;-6,924 – 10,924
HR	63±3,06	67±5,1	2,301; 0,593 – 7,407

T.1 Comparison of groups by initial data. T_{32} =2,037

There were no differences in two groups in age, VTI and SBP by initial data. Also they were on referent diapason. The most negative outcome of epidural analgesia during anesthesia is a sympathetic blockade, that causes the hypotension and requires the infusion of vasopressors. We compared the Odds Ratio of the risk of using norepinephrine. It was 12 times more in the 2nd group (OR (EA vs ESPB) = 12 (95%CI:10,2-13,8)).

Also, by monitoring the VTI we concluded that with the cut of point, which is more than a 5% decrease in the VTI, EA differs from ESPB by 80% Sensitivity and 79% Specificity.

In addition, the value of the VTI that is less than 13,5 was moderately related to the EA (Area under the curve (AUC) was 0.685, with the significance level of 0.093, 90% Sensitivity and 70% Specificity).

Parameters	Group 1 (ESPB), Mean±σ	Group 2 (EA), Mean±σ
Score (VAS)	3,3±1,33	2,6±1,27
T criterion	-1,445	
95% CI on difference	-1,650-0,250	

T.2 Comparison of visual analogue scale (VAS) score. T_{32} =2,037

All patients were examined just after anesthesia with VAS. Two groups don't have significant differences by pain score due to T criterion which was less than tabular value. Further some patients were transported to intensive care unit (ICU) and were administered trimeperidini (10 mg every 8 h.) during first day. While patients who continued their care in surgical department were prescribed tramadoli (100 mg every 8 h.) during first day. Thanks to this fact further comparison of that groups by pain score was impossible.

Conclusion

During our research we proved that ESP block is a simpler and safer procedure compared to epidural block, it does not cause adverse hemodynamic effects in comorbid patients. Moreover, modern interfascial block provides sufficient pain control during and after laparoscopic colorectal resections.

1. Clinical Recommendations. Colorectal cancer. – 2022-2023-2024 (12.12.2022) – Approved by the Ministry of Health of Russian Federation.

2. J.J. Choi, Y.J. Chang, D. Lee, H.W.Kim, H.J. Kwak. Effect of Erector Spinae Plane Block on Postoperative Pain after Laparoscopic Colorectal Surgery: A Randomized Controlled Study.// *Journal of Personalized Medicine* // - 2022 - *12*(10), 1717; https://doi.org/10.3390/jpm12101717.

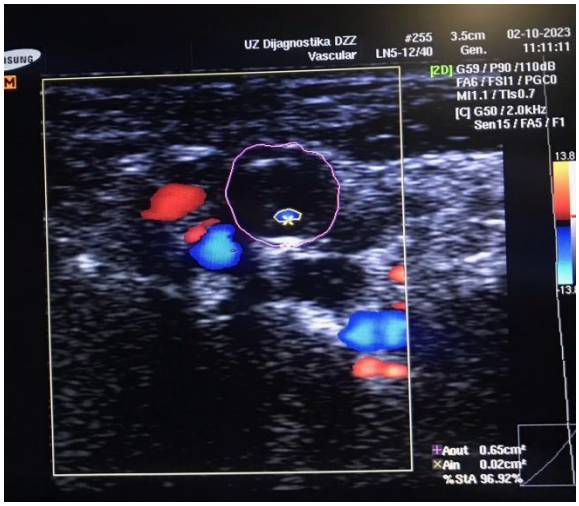
POCUS IN PRIMARY HEALTHCARE

Case Reports

Dr. Danijel Oderković,
POCUS Academy of Serbia

Suboccluded left ICA

A 68-year-old patient presented to the clinic with right-sided hemiparesis, aphasia, and agitation. A Color Duplex scan of the carotid arteries revealed an initially observed "staccato" pattern on the PW Doppler of the left common carotid artery (CCA), raising suspicion of distal occlusion. Further scanning identified subocclusion of the left internal carotid artery (ICA) (see image) and a total stenosis of 97%. The patient was promptly referred to a vascular surgeon, and a multislice computed tomography (MSCT) angiography confirmed the presence of critical stenosis of the left ICA. However, given the patient's age and comorbidities, surgery was not indicated, and conservative therapy was pursued.



Suboccluded left ICA

Liver cancer

A 71-year-old female patient presented to the clinic with prominent jaundice and dyspeptic symptoms. She denied other complaints. An abdominal ultrasound revealed dilation of intrahepatic bile ducts and the common bile duct (14mm), complete gallbladder opacification with sludge and a larger calculus. Additionally, an irregular hypoechoic change measuring 55x48mm was noted beside gallbladder. The patient was referred to a surgeon, underwent a CT scan, and subsequently had a cholecystectomy. A sample was sent for histopathological analysis, revealing a diagnosis of hepatocellular carcinoma. Unfortunately, the patient succumbed to the illness after one month.

Liver mass

GLOMUS TUMOR ON ULTRASOUND

Dr. Ivica Zdravkovic, Serbia
Dr. Danijel Oderković, Serbia

INTRODUCTION

The glomus caroticus, also known as the carotid body, is a small cluster of chemoreceptor cells located near the bifurcation of the common carotid artery. This structure plays a crucial role in the regulation of respiratory and cardiovascular functions by sensing changes in the levels of oxygen, carbon dioxide, and pH in the blood.

The carotid body consists of specialized cells called glomus cells, which are richly supplied with blood vessels and nerve fibers. These cells are sensitive to changes in the chemical composition of the blood, particularly alterations in oxygen tension (hypoxia), carbon dioxide levels, and pH. When the carotid body detects a decrease in oxygen or an increase in carbon dioxide or acidity, it sends signals to the brainstem to initiate adjustments in breathing and heart rate.

Pathological conditions affecting the carotid body, such as tumors (carotid body tumors or paragangliomas), can lead to overactivity and result in abnormal respiratory and cardiovascular responses. Surgical removal of these tumors may be necessary in certain cases.

Tumors of the carotid body, known as carotid body tumors or carotid body paragangliomas, are relatively rare. These tumors arise from the specialized cells (glomus cells) of the carotid body, which are part of the peripheral nervous system. While they are uncommon, carotid body tumors are the most common type of head and neck paragangliomas.

The exact incidence of carotid body tumors is not well-established, but they are generally considered to be rare neoplasms. The tumors are more commonly diagnosed in adults, and there is a slight female predominance. The majority of carotid body tumors are non-cancerous (benign), but they can be locally invasive and may cause symptoms due to their location and effects on surrounding structures.

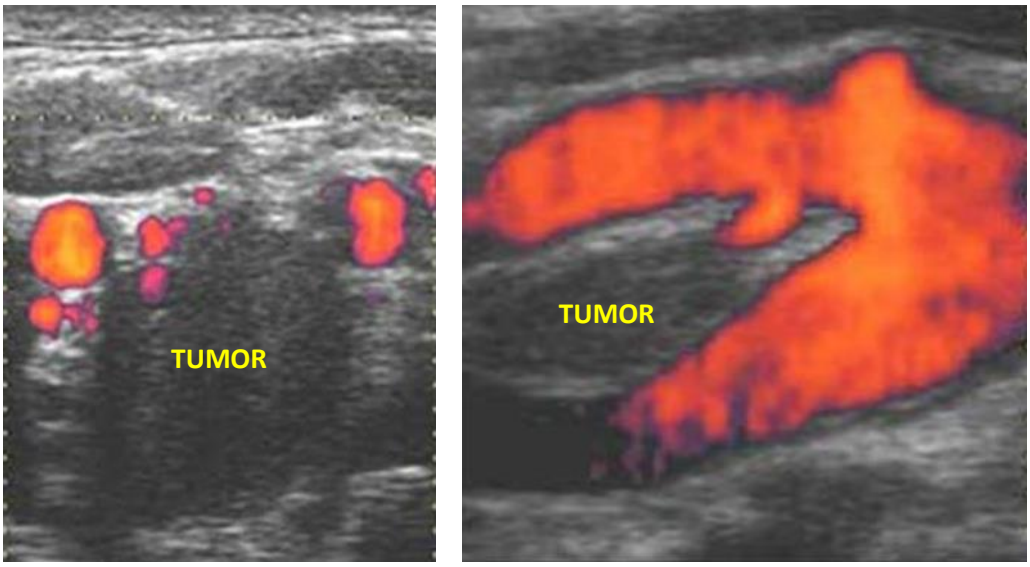
Clinical presentation may include a painless, slow-growing mass in the neck, as well as symptoms related to compression of adjacent structures, such as difficulty swallowing or changes in voice. In some cases, carotid body tumors may be discovered incidentally during imaging studies for unrelated issues.

CASE REPORT

The patient is a 57-year-old male who comes for a routine ultrasound examination of the neck and leg blood vessels. He has been suffering from insulin-dependent diabetes mellitus for several years and is on intensive insulin therapy. During the Doppler examination of the carotid arteries, a hypoechoic change with cystic components is found at the level of the bifurcation of the right common carotid artery (CCA). It is well-vascularized, lacks the classic hilus like a lymph node (LND), and is more consistent with a glomus tumor of the bulb, measuring 29x17mm.

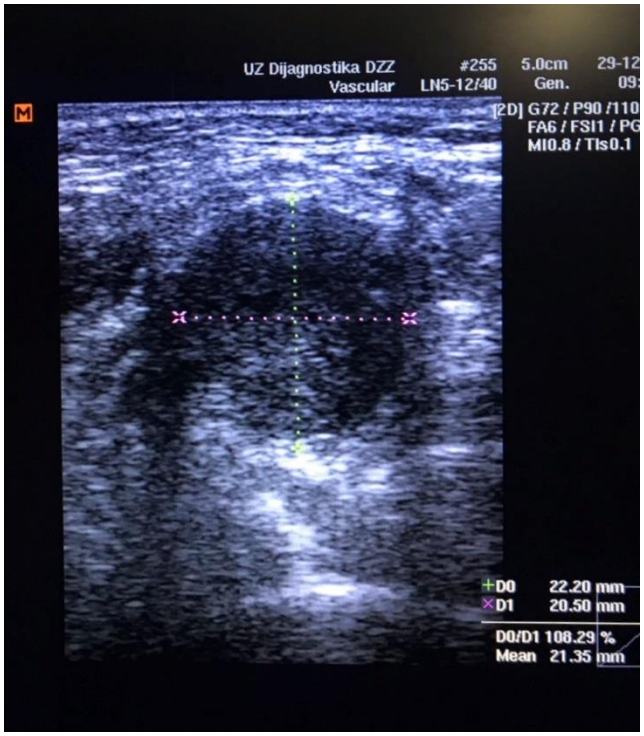
The patient was referred for a neck CT, and it was suggested that he consult with his family doctor. After a few months, the patient returns to the clinic for other diagnostics, bringing the information that the glomus tumor, suspected based on the ultrasound findings, has been successfully removed.

Following is the image we found on internet, similar to (sadly lost) images seen during the inituial exam:



Transverse and longitudinal scan, right ICA and ECA separated by hypoechoic tumor

A month later, incidentally, another patient came to ultrasound exam and we found ONE MORE glomus tumor - and this is the image we took:



CONCLUSION

Due to the frequent focus mainly on significant pathology, i.e., the most common pathological disorders, clinical ultrasound diagnostics can fall into the trap of categorizing rarer conditions as common or failing to recognize them. In the reported case, it was easy to mistake the change for a lymph node, thus missing the opportunity to diagnose a truly rare pathological phenomenon. It is necessary to repeatedly reconsider the differential diagnostic options and not oversimplify the diagnostic process at all costs. One of the favorite sayings of the author of this text is: "If you hear the clip-clop of hooves outside the window, it's likely a horse, not a zebra." This statement illustrates the thought process one should adopt when considering potential diagnoses. However, occasionally, very rarely, a zebra might indeed stroll by.

CONTENT:

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